Triple Constraints *du jour*
Today we will cover...

- Cost-Benefit Analysis (CBA)
  - Costs
  - Benefits
  - Analysis
  - Return on Investment (ROI)
  - Total Cost of Ownership (TCO)
  - Payback period
  - Spreadsheet example
  - CTP procedures

- And...

So What?
VITA enables diverse business needs
• **Guess what:** Information Technology can enable agencies to do all of the above.

• So, the Commonwealth INVESTS taxpayer money in information technology projects to serve its citizens better, faster, cheaper, etc.

• IT Projects (and Project Management) is the best method we know by which agencies develop and implement new capabilities.
Consequently, the Commonwealth currently has more than 1/3 of a BILLION dollar investment in IT Projects.

Wow! That’s a lot of money.

$356,048,137.35 as of October, 2016

37 Commonwealth-level IT Projects
CBA: Required!

- Supports the financial justification for choosing a given alternative IT investment.

- It’s not the ONLY reason to choose a given alternative.

- We owe it to the Commonwealth citizens to make smart, justifiable IT investments.

www.vita.virginia.gov
CBA: Required!

COV ITRM Project Management Standard CPM 112-03.6:

• Cost Benefit Analysis required for Category 1, 2, 3 projects.

• Category 4 project:
  – “While a detailed Cost Benefit Analysis is not required for Category Four projects, the Business Case and Alternatives Analysis should, as a minimum, list the potential tangible and intangible benefits that are expected to accrue from completion of the project and the expected Return on Investment (ROI).”
CBA.xlsx

- CBA.xlsx replaces the CBA form in the Commonwealth Technology Portfolio (CTP)
- Complete the CBA.xlsx (Save As… your own version); upload to CTP when complete
- Analyze at least three scenarios:
  - “Do Nothing”
  - Alternative (Alt.) 1
  - Alternative (Alt.) 2
  - Alternative (Alt.) 3… is there if you need it.
- Period of analysis: Six years from project implementation
  - Use Fiscal Years (July 1 – June 30)
Cost-Benefit Analysis (CBA)

- Simple tool that will help you decide which solution makes the most sense from a financial point of view.

- CBA can help you:
  - Decide whether to make a change.
  - Identify costs associated with potential benefits.
  - Evaluate several options for financial impact.
  - Final selection should return the greatest overall benefit for incurred cost.
Ideally...

- Benefits will outweigh costs. But...
- Mandates may override purely financial analysis
- Maybe no alternative has net benefits; It may be a comparison of which alternative costs less.
- Still, CBA will help identify the best financial alternative.
CBA is “silent” on...

• Non-monetary measures.
  – Customer satisfaction
• Probabilities of success.
  – iPhone
• Political considerations.
  – Yes, political considerations.

• Based upon these analyses, a solution is proposed in the next step of the process.
More caveats...

- Caveat: a warning or proviso of specific stipulations, conditions, or limitations.

- Just because a project is mandated does not mean there is only one solution.

- Change in procedure is sometimes more cost effective than developing an automation solution.

- Assumptions abound! (Please annotate them.)
Car Scenario: Consider...

1. Costs
   - Immediate / up-front
   - Ongoing

2. Benefits
   - Direct, tangible
   - Indirect, intangible

3. Analysis
   - TCO
   - ROI

4. Decide!
   - Other influencing factors
Cost Benefit Analysis: 3 Steps

1. Determine Costs
2. Calculate Benefits
3. Compare alternatives

• BTW, Assumptions abound!
CBA Step #1: Determine Costs

- **Project costs**
  - 12 budget categories in CTP (and CBA.xlsx)
    - Project (implementation) costs
    - Remember, include people costs!
  - Use real estimates

- **Operation & Maintenance (O&M) Costs:**
  - (Additional) Staffing Costs
    - 3 staffing categories in CTP (and CBA.xlsx)
  - Other Operational Costs
    - 9 budget categories in CTP (and CBA.xlsx)
  - Use **real** estimates; **NOT** +/- compared to today
  - Six years from project implementation!
Estimating Costs: Project and O&M

• Early estimates of costs in the Select and Initiation phases will be Rough Order of Magnitude, (ROM) with a range of +/- 50% (or more)

• Later in the Planning phase the range should be lower to +/- 10%

• Ballpark
Estimating Costs: Input ideas

- Scope statement
- WBS
- Schedule
- Risks register
- Market conditions
- Your organization’s cost estimating policies
- Cost estimating templates
- Historical information
- Lessons learned
- Your own experiences and judgments
Estimating Costs: Tools, Techniques

- Expert judgement
- Analogous estimating
  - Uses actual costs of previous projects along with expert judgement
- Parametric
  - Uses formulas to determine costs
- Bottom up
  - Estimating individual components of work then adding up
- Three point estimating
  - Most likely, Optimistic, Pessimistic
- Some project management software tools have templates for determining project costs
Determine Costs: ‘Do Nothing’ Alt.

Do Nothing: What does it cost to maintain the current / legacy system?

1. Establishes a baseline cost.
2. The current “system” could be a manual process, an existing IT solution, or a combination of the two.
3. Make assumptions about how costs may change during the period of analysis
   - Maintenance, upgrades
   - Additional staff
4. BTW, ‘Do Nothing’ might be the most economically feasible, but other factors may drive the decision.
WE OFFER THREE KINDS OF SERVICE:

GOOD – CHEAP – FAST

YOU CAN PICK ANY TWO

GOOD service CHEAP won’t be FAST
GOOD service FAST won’t be CHEAP
FAST service CHEAP won’t be GOOD

Project Management: *Pick two, any two*…
Total Cost of Ownership: TCO

- *Total Cost of Ownership (TCO)* is the price of implementing a project plus the *costs* of operation & maintenance over a given time period. When choosing among alternatives, decision-makers should look not just at an investment's short-term cost, but also at its long-term cost, which is the *total cost of ownership*.

- Implementation Cost + O&M (for a given time period) = TCO
CBA Step #2: Calculate Benefits

- Value of labor saved
- Quality improvements
- Revenue increase
- Production (efficiency) increase
  - More efficient business processes
- Staffing reduction
  - More efficient staff
- Better information: customer, production, etc.
  - Better data management
  - More secure data - ?
Benefits overview

• Tangible:
  – Cost Savings
  – Cost Avoidance
  – Increased Revenue
  – What about Federal Grants?

• Intangible:
  – Improved quality of life
  – Increase in public safety or accessibility
  – Increased capacity / risk reduction
  – Better data management
  – More secure data - ?

“Don’t go overboard trying to “dollarize” intangible benefits…”
Tangible Benefits

• Cost Savings
  – Increased efficiency / throughput
  – Higher quality = increased effectiveness
  – CBA.xlsx: “Benefit 1. (Note 1.)” = calculated field. O&M savings compared to "Do Nothing" alternative ("Do Nothing" row 38 - row 38)

• Cost Avoidance
  – Avoid hiring staff
  – Avoid technical costs
  – Avoid penalty costs
  – CBA.xlsx: “Benefit 2. (Note 2.)” = Cost Avoidance: If we select this alternative, we will NOT have to purchase _______ in the "Do Nothing" scenario.
Tangible Benefits, cont’d.

• Increased Revenue
  – This only applies to a few agencies…
  – CBA.xlsx: “Benefit 3. (Note 3.)” = *Increased Revenues: If we select this alternative, our organization will collect additional revenues.*

• What about Federal Grants?
  – Considered a reduction to costs (rather than a benefit)
  – Not many agencies will use this feature
  – CBA.xlsx hide/unhide pink rows to reveal Virginia-specific costs
Qualify & Quantify Benefits

• Who are the beneficiaries (stakeholders)?
  – They should be identified in the charter

• Interview the stakeholders and identify the benefit to the stakeholder and how it is derived.
  – (Enter all notes, formulas and calculations in the BCAA)

• Identify all Business Objectives and Tangible Benefits in Measures of Success
  – What does success look like (Qualify)
  – How will it be measured (Quantify)

Remember: Better, Faster, Cheaper, Smarter, More Secure, etc.
Brainstorming Project Benefits

• If you know the product, Does another state use it? If so, research to see if they have done a CBA for that product.

• If you know the product, look at the vendor marketing material; it can give you ideas on how it can benefit your organization.

• Look at other projects in CTP for ideas; talk to PMD Consultant for ideas.

• Interview stakeholders, users, customers…
CBA Step #3: Compare Alternatives

CBA.xlsx automatically calculates (cumulative and total):

- Project costs
- Operations & Maintenance costs
- TCO
- Benefits:
  - Cost Savings
  - Cost Avoidance
  - Increased Revenues
- ROI
- Pretty graphs
- YOU have to calculate Breakeven point – but it is easy.
Return on Investment (ROI)

- ROI: The difference between the cost of a project and the financial benefits that the completed project provides.
- (PM Standard = over a six year period)
- Project Benefits – Project Cost = ROI
- ROI often expressed as a percentage:
  - \([(\text{Total Benefits} - \text{Total Cost}) / \text{Total Cost}] \times 100\% = \%ROI\)
- CBA.xlsx calculates ROI automatically.
Breakeven Point

- Breakeven Point: The year when the ROI changes from negative to positive.
- Represents when the IT investment “pays for itself”
- Sooner = better
- On CBA.xlsx, examine the ROI over the six years of analysis; observe when the ROI becomes positive
- ROI might not become positive in six years
Business Case and Alternatives Analysis (BCAA)

- BCAA provides an opportunity to elaborate on information in the CBA.
  - Explain summarized cost and benefit amounts.
  - Highlight intangible benefits and qualify mandates.
  - Document efforts to identify solutions in other organization or collaboration with other organization on a common solution.

- Allows the project team to further justify the proposed solution with details not evident in the CBA.
Business Problem – a Question, Issue, or Situation which needs to be answered or resolved.

- Often to get the correct perspective you might phrase the statement beginning, “The problem exists that…”
- Do not enter here, the description of the solution. That will come later.
**BCAA – Project Scope Statement**

**Project Scope** – defines all of the products, services or results provided by a project and identifies the limits of the project. In this block enter:

- High Level Project Requirements
- Project Boundaries – What is **IN** and **OUT** of scope
- Project Strategy – Development methodology
- Project Deliverables
- Acceptance Criteria
- Project Assumptions - circumstances and events that need to occur for the project to be successful, but are outside the total control of the project team.
- Cost Estimates
### BCAA – Solution Comparison

**Recommended Solution & Justification**

<table>
<thead>
<tr>
<th>Intangible Weighting Justification of Solution</th>
</tr>
</thead>
<tbody>
<tr>
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Comparison of Solutions

Based on the analysis performed, rate how each solution measured up against each decision criterion. A recommended Ranges from Poor to Good. Compare the rating results to determine which solution to recommend. Enter in the Solution Identifier in Boxes that apply.

### Project Analysis - Solution Comparison

<table>
<thead>
<tr>
<th>Decision Criteria</th>
<th>Solution 1</th>
<th>Solution 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Process Impact</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Technical Feasibility</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Maturity of Solution</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Resources Required</td>
<td>Fair</td>
<td>Good</td>
</tr>
<tr>
<td>Constraints Impact</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Cost Benefit Analysis</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Return on Investment</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>Other</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
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</tbody>
</table>
“Resources & CBA” Tab:

- Project Resources table: Copy & paste Budget figures directly from CBA.xlsx
- O&M Resources table: Copy & paste O&M figures directly from CBA.xlsx
- CBA Summary:
  - Delete the CBA table and…
  - Add two text boxes:
    - Cost Benefit Analysis Summary: Copy & paste from the “Cost Benefit Analysis Summary” text block for the chosen solution in the BCAA form.
    - Return on Investment (ROI) Summary: Summarize the results of the ROI Analysis for the chosen solution. Copy & paste from the “Return on Investment (ROI) Summary” text block for the chosen solution in the BCAA form.
Summary: A Cost Benefit Analysis provides:

• An opportunity to:
  – identify the costs of a solution.
  – identify the benefits of a solution.
  – compare solutions from a financial perspective.

• Helps you identify a solution that makes the most sense for your particular situation.